Nintendo Wii Free Run vs. Treadmill Running: A Comparison of Physiological and Metabolic Data

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Nintendo Wii exergaming has been suggested as an adjunct to increase physical activity levels, with Nintendo stating Wii Free Run (WFR) is a 4 MET activity. However, prior to prescribing exergaming as an effective form of exercise, the reliability and validity needs to be determined. **Purpose:** To compare physiological differences between WFR and treadmill running (TR) at a theoretically equivalent intensity. Also, to compare the distance traveled during TR to the distance traveled in WFR (provided by gaming system). **Methods:** Twenty-eight college age participants (20 males, 8 females) were fitted with a portable metabolic cart and heart rate (HR) monitor. Participants performed six minutes of both WFR and TR ($1.16 m \cdot s^{-1}$) separated by five minutes of seated rest. Treadmill speed was determined with ACSM's calculation for treadmill running at 4 METs, whereas participants self-selected their exercise intensity for the WFR. Metabolic and HR data were continuously recorded for WFR, rest, and TR conditions, with electronic markers used to indicate the beginning and end of each condition. Mean data from 3.0 to 5.5 minutes of each condition were compared using paired t-tests, and the absolute value of the difference between conditions (|WFR – TR|) was compared to zero using a one-sample t-test. **Results:** There was no significant difference between WFR and TR for mean HR or MET values, however, there was a significant difference in absolute values for HR (9.5 ± 7.8 bpm, $p \leq 0.001$) and METs (0.77 ± 0.58, $p \leq 0.001$). WFR also showed a significantly greater mean distance traveled compared to TR (907.6 ± 51.2 m, $p \leq 0.001$). **Conclusion:** Although there were no significant differences in mean HR or METs between conditions, there was a significant difference when the magnitude of the difference was examined. This highlights individual variations in metabolic responses during WFR, likely due to self-regulated WFR intensity. Further, WFR likely overestimated distance due to the sensitivity of the Wii controller being influenced by factors other than stepping rate. Thus it seems WFR is an acceptable estimator of metabolic activity, but a poor estimator of distance.